



General Relativity and Quantum Cosmology

# Evolution in bouncing quantum cosmology

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We present the method of describing an evolution in quantum cosmology in the framework of the reduced phase space quantization of loop cosmology. We apply our method to the flat Friedman-Robertson-Walker model coupled to a massless scalar field. We identify the physical quantum Hamiltonian that is positive-definite and generates globally an unitary evolution of considered quantum system. We examine properties of expectation values of physical observables in the process of the quantum big bounce transition. The dispersion of evolved observables are studied for the Gaussian state. Calculated relative fluctuations enable an examination of the semi-classicality conditions and possible occurrence of the cosmic forgetfulness. Preliminary estimations based on the cosmological data suggest that there was no cosmic amnesia. Presented results are analytical, and numerical computations are only used for the visualization purposes. Our method may be generalized to sophisticated cosmological models including the Bianchi type universes.

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